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PATENT COOPERATION TREATY

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Translation

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 40 583.mey.sev	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/EP2003/000237	International filing date (day/month/year) 13 January 2003 (13.01.2003)	Priority date (day/month/year) 15 January 2002 (15.01.2002)
International Patent Classification (IPC) or national classification and IPC C21C 5/52		
Applicant SMS DEMAG AKTIENGESELLSCHAFT		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 5 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 16 July 2003 (16.07.2003)	Date of completion of this report 24 May 2004 (24.05.2004)
Name and mailing address of the IPEA/EP	Authorized officer
Facsimile No.	Telephone No.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/EP2003/000237

I. Basis of the report

1. This report has been drawn on the basis of *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.)*:

☐ the international application as originally filed.

☒ the description, pages 1-15, as originally filed,
pages _____, filed with the demand,
pages _____, filed with the letter of _____,
pages _____, filed with the letter of _____.

☒ the claims, Nos. _____, as originally filed,
Nos. _____, as amended under Article 19,
Nos. 23, 24, filed with the demand,
Nos. 1-22, filed with the letter of 06 April 2004 (06.04.2004),
Nos. _____, filed with the letter of _____.

☒ the drawings, sheets/fig 1/4-4/4, as originally filed,
sheets/fig _____, filed with the demand,
sheets/fig _____, filed with the letter of _____,
sheets/fig _____, filed with the letter of _____.

2. The amendments have resulted in the cancellation of:

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/fig _____

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

4. Additional observations, if necessary:

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

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V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. Statement**

Novelty (N)	Claims	1-22	YES
	Claims		NO
Inventive step (IS)	Claims	1-22	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-22	YES
	Claims		NO

2. Citations and explanations

Reference is made to the following documents:

D1: EP-A-0 866 138

D2: FR-A-2 681 417

The amendments submitted with the letter of 6 April 2004 do not introduce substantive matter which, contrary to PCT Article 34(2)(b), goes beyond the disclosure in the international application as filed.

Novelty and inventive step

D1, which is considered to be the prior art closest to claim 1, discloses (cf. column 4, line 35 to column 5, line 40) a method for the pyrometallurgical treatment of metals. In this method an oxygen-containing gas is passed centrally through to an injector device and accelerated to a supersonic velocity (column 4, line 14: 150-915 m/s). By means of an annular nozzle this gas stream is surrounded with a flame envelope which has a velocity less (column 6, line 26: 15-150 m/s) than that of the main gas stream.

The present invention as defined in claim 1 (method) differs from the available prior art by virtue of the following technical features:

the velocity of the flame envelope is far less than that

of the main gas, and the gases forming the flame envelope have not been preheated.

The technical effect consists in achieving maximisation of the gas jet length and depth of penetration into the layer of slag disposed above the molten metal in order to produce intensive intermixing and movement.

The technical problem of maximising the gas jet length and penetration depth is solved by the applicant in that a device is provided (claim 15) consisting of an oxygen injector with interior wall and Laval nozzle, surrounded by a hot gas pipe connection with, in the outlet region thereof, an annular nozzle.

This device is used to carry out the method defined in claim 1.

Neither the method (claim 1) nor the device (claim 15) is known from the available prior art. Nor was it possible for the applicant to deduce the procedure defined in the application from the prior art.

Dependent claims 2-14 and 16-22 provide further specifications for the method/device claimed in claim 1 and claim 15 respectively. These claims therefore likewise involve an inventive step.

Industrial applicability

The invention, method and device can be used in the pyrometallurgical treatment of metals, molten metals and/or slags.